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TELE-OBSERVATION--CLOSED CIRCUIT TELEVISION AND VIDEO-RECORDING IN TEACHER TRAINING.

BY- BJERSTEDT, A.
SCHOOL OF EDUC., MALMO (SWEDEN)

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THE POTENTIAL OF CLOSED CIRCUIT TELEVISION AND VIDEO TAPE RECORDINGS AS "OBSERVATION AMPLIFIERS" IN TEACHER TRAINING IS EXPLORED. IT IS FELT THAT DEMONSTRATIONS VIEWED VIA THESE MEDIA CAN BE MORE EFFECTIVE THAN LIVE DEMONSTRATIONS. SUGGESTIONS ARE MADE FOR FURTHER RESEARCH. (MS)

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TELE-OBSERVATION: CLOSED-CIRCUIT TELEVISION AND VIDEO-RECORDING IN TEACHER TRAINING

Abstract. – What are some of the problems and shortcomings in the present teacher training situation? In what respects can closed-circuit television and video-recordings as "observation amplifiers" help to overcome these difficulties? What further research is necessary before full use can be made of these aids in teacher training? Some possible answers to these questions are outlined and discussed.

Closed-circuit television (CCTV) and video-recording have begun to be used in many places in the world, both in ordinary school teaching and in teacher training. Like all innovations in the field of education, especially those of a technical character, they have been received both with hasty enthusiasm (an aid which will solve practically all acute problems) and exaggerated scepticism (a toy for novelty seekers, a new robot, another threat to the teacher's integrity etc.). The advocates of this new aid are certainly partly to blame for these extreme conceptions. They have, for example, sometimes been more interested in delightedly demonstrating every conceivable use of the new toy than in pointing out what difficulties in traditional teaching and teacher training it could possibly help to overcome. It should be obvious that it is more advantageous to start from a problem situation and adapt the new aid to it than to start from a technical device and try to find suitable uses for it. The former procedure obviously provides a better starting point for successful technical and pedagogical development and is less likely to lead to complacent acceptance of the innovation in its present form.

What, then, are some of the problems and shortcomings in the present teacher training situation? In what respects can CCTV and video-recording help to overcome these difficulties? What ought these new aids be able to do better than the traditional ones? What further research is necessary before full use can be made of them in teacher training? I shall here attempt to outline some possible answers to these questions.

Some difficulties in traditional teacher training

One striking difficulty in teacher training is that of integrating the theoretical and practical aspects. There has been, and still is, a great deal of discussion about this problem, but we are far from having reached a generally accepted satisfactory solution to it. Unfortunately

the teaching of theory and the practice in the classroom are often comparatively closed worlds, in which to some extent different languages are spoken. It is not always easy for the student teacher to divine the connection between the theoretical background and the practical treatment. There are many reasons for this. One special difficulty, which is perhaps sometimes forgotten, is that of illustrating the human reactions and methodic sequences one is talking about in a lecture, and which the student teacher will be confronted with later on. Verbal descriptions, abstract diagrams or photographs are often too far removed from the interactions and processes in actual practice to give the student teacher a concrete picture of what it is all about. The gap between the content of the lecture on methods and the actual classroom behavior sometimes seems, therefore, to be greater than it actually is. Sound films of teaching situations have been one of the few aids we have had for giving information about actual behavior sequences. But as everyone engaged in teacher training knows, good films on teaching are few and far between (because they are expensive to produce, especially in a small language area, and because shooting a sound film is so complicated technically that it is difficult to keep the classroom situation convincingly natural).

To present information about what goes on in the classroom we have relied instead to a considerable extent on separate observation or study visits by student teachers to actual classes. In theory, this is a relatively good solution which we by no means wish to see disappear. There is only the risk – which has been very obvious – that we find it difficult to integrate the experiences gained during these observations with other parts of the training. It is of course not the intention to create yet another closed world in the student teacher's information system! In fact, students often complain that their observation periods seem to some degree meaningless, unnecessarily time-consuming, and not particularly informative. Lecturers in education and teaching methods have indeed tried hard to make these observations a more meaningful experience by means of preparation beforehand and by follow-up discussions. But these attempts have not been entirely successful owing to a whole series of difficulties in classroom observation as it is normally organised. I shall briefly indicate a number of these difficulties.

Direct observation by student teachers can usually take place only in a limited geographical area if too much time is not to be spent in travelling. This considerably reduces the possibilities of choosing for all students the particular teaching we want them to see at a given

point during their training: demonstration of a particular method (by an excellent teacher) to illustrate a particular type of content. To a great extent, observation periods offer unsystematically just what happens to be available. The value of what different students gain from observation periods varies widely; their background of experience becomes different; and it is not easy for the teacher of educational theory to provide effective preparation and follow-up for such heterogeneous material. Since what is observed is mostly decided by pure chance, teachers of method and pedagogy are usually working in the dark when they try to "direct" the observation. It would be preferable if experiences gained from observation periods occurred in a definite systematic order which would be the same for all students and correspond to the various stages of theory teaching, but it seems almost impossible to arrange such a desirable sequence for everyone.

The ideal would be a three-phase combination of the following type: (1) adequate introductory commentary to direct the student's observation of a situation known in advance to the lecturer in education + (2) a model demonstration lesson adequately related the theory being taught at that time + (3) relevant commentary afterwards. Instead of this we can get, at the worst, (1) a meaningless introduction: a "blind direction" + (2) a demonstration lesson unrelated to the theory teaching and not good enough to serve as a model + (3) an irrelevant commentary, equally "in the dark". It is not surprising that students sometimes consider all this meaningless. To avoid this kind of "blind direction", students are sometimes directed to observe phenomena which are "certain to arise": they are told, for example, to make general psychological observations of pupils in the class. These are of course important and valuable in themselves, but this type of observation should in no circumstances replace that of the didactic interaction in various types of teaching situations.

Another risk with direct observation in a geographically restricted area is that certain infrequent subjects for observation cannot be made available at all for a large group of students. (What happens in a school maturity test? How does one work in a remedial arithmetic class? How are beginners introduced to a language laboratory? How is sex instruction planned? etc. etc.) As observation lessons are traditionally arranged, it is a matter of pure chance whether or not a student gets the opportunity of observing special points such as these.

But there are further difficulties. Students often miss important points because it is not possible for an experienced person to comment

on the lesson while it is in progress. The teaching must not be disturbed too much and the lecturer in educational theory, who should best be able to give a commentary which fits in with his theory teaching, can only be in one place and not with all the scattered groups of observers.

Sometimes the student can only partially follow the course of events in the classroom, even if he has noticed that something important is going on. For fear of disturbing what is happening in the classroom, he often remains seated on his chair in the corner, when the point of interest is the interaction between pupils in a group at work at the other end of the classroom or that between an individual pupil and some self-instructional material.

In parenthesis, it is natural here to ask: How disturbing do the pupils in our practice schools find the presence of student teachers during normal observation periods? Ideas about this appear to be very different – from the very negative viewpoints expressed by the occasional parent or pupil in the correspondence columns of the press to the often exaggerated optimism sometimes heard from those engaged in teacher training ("the pupils are completely undisturbed and scarcely notice whether students are listening to the lessons or not"). Some data from an attitude investigation among pupils in Malmö (Table 1) may illustrate this (Jivén & Svensson, 1966). There are obviously several sources of error in a descriptive spot investigation of this kind, and reliable conclusions of detail should not be expected. However, one cannot get away from the fact that about a third of the approx. 540 pupils questioned thought that the observers were more or less disturbing for themselves and for the teaching in general, and that the figures could be considerably higher in certain grades (e.g. in the final year of the Swedish comprehensive school, grade 9) or when the question concerned certain particular types of school situation (e.g. oral tests or individual work). Over half the pupils considered that too many student teachers came to observe lessons, and to the direct question how many should come at one time, most replied "two"; 85 % chose 1, 2, 3 or 4 as the maximum number. Even if data of these types are always difficult to interpret, they serve to remind us that we cannot simply close our eyes to the problem of disturbance.

Sometimes the observer's experience would be much more valuable if he could simultaneously compare what was happening in two or more classrooms where teaching of the same subject-matter was being carried on in different ways. But this is of course quite impossible in the normal observation situation.

In addition, the lecturer in method or education might sometimes want to manipulate the observed reality in order more effectively to demonstrate the essential point. Everything that happens in a classroom is obviously not of equal value to an observer. One may have to wait quite a long time before a phenomenon which is of special importance for a certain stage in the teaching of theory happens; it may not arise at all in the course of a particular lesson for an individual observer. A great deal of valuable time would be saved if, at least in certain cases, it was

Table 1. How disturbing do pupils find ordinary observation periods? Some data from an attitude investigation among pupils in Malmö.

Item	Percentage experiencing "disturbance" (answer alternatives 1+2, cf. note below)			
	All pupils school-years 7-11		Final year of comprehensive school	
	%	(n)	M (n=46) %	F (n=58) %
A. Disturbing for teaching (in general)	36	(542)	57	57
B. Disturbing for the respondent personally	32	(541)	46	55
C. Disturbing in oral tests	57	(543)	70	74
D. Disturbing during individual work	45	(543)	50	64

Note. Total group of pupils consisted of students at the Heleneholm School in Malmö at the end of the spring term 1966 (the students of grade 12 had then left the school) who had had experience of student teachers observing their lessons. The total material was approx. 540 pupils (cf. col. n in Table). The items in the attitude questionnaire referred to here were as follows: A. I consider that student teachers as observers disturb the teaching. B. I consider that student teachers as observers are disturbing to me. C. I consider it unsuitable that student teachers should be present during oral tests. D. I consider it unsuitable for student teachers to be present when we are working individually. The alternative answers which each pupil had to choose between were: 1) I agree completely. 2) I agree to a large extent. 3) It depends. 4) I disagree to a large extent. 5) I disagree completely. The percentage figures in the table give the proportion of pupils who chose one out of alternatives 1 and 2. Reference: More detailed information about the result of the investigation can be found in the Swedish report, Jivén & Svensson, 1966.

possible to shorten the lesson time and cut out unimportant things so as to leave the pedagogic essentials. But how can such a conjuring trick be performed in an ordinary observation situation?

Let us do a little more wishful thinking! When something of importance has just happened (e.g., when a certain type of breach of discipline has been committed), one would sometimes like to interrupt the lesson at that point and discuss it with the student teacher (What was it that happened? How would you have behaved if you had been in the teacher's place? What consequences do you think there would be if you did this or that?). And after such a pause for student teacher activity, one would like to be able to "switch on" the reality again and see what the teacher in fact did and how the situation developed. But again, such tricks cannot be done in the present every-day kind of observation lesson.

And while we are on the subject of the supernatural, would it not be extraordinarily useful if the student teacher could sit in as an observer in his own practice lessons and actually see his own mistakes and merits, with or without a simultaneous commentary by a tutor? Would this not be a more valuable experience than simply an oral commentary afterwards by an outsider, against whom the student is very likely to invoke various defence mechanisms ("that unfair know-all and his hobby-horses...; I certainly didn't do that ...").

An additional difficulty in teacher training today, and one that is occasionally mentioned only in hushed tones, is of course that we still have comparatively slight knowledge about many questions in the method of teaching. We think we know quite a lot, but in fact real knowledge of classroom interactions and teaching processes is relatively modest, for the simple reason that the number of research workers who have been concerned with central and concrete problems of teaching method have been very few, and there have been a lack of good recording instruments for objective analysis of classroom phenomena. This means that lecturers in method are often forced to serve up the diversiform stones of subjective interpretation instead of the bread of real knowledge, a confusingly variegated and not particularly nourishing diet. This difficulty cannot be quickly overcome. It needs a large number of people to be engaged in long--time, patient research.

Closed-circuit television and video-recording: What are they?

Before we pass on to our second main question, namely to what degree closed-circuit television and video-recording can contribute to overcoming some of the difficulties in teacher training we have mentioned, it would perhaps be as well to give a brief recapitulation of the main general characteristics of these aids.

"Closed-circuit television" (CCTV) commonly means the transmission of sound and pictures to receivers within a closed system, e.g. by means of cables (as opposed to the open "broadcast television"). Thus a CCTV system is usually clearly defined in its scope, which does not, however, necessarily mean that it is small. It can be a very small classroom system (where camera and receiver are both in the same room for demonstration purposes, sometimes called "desk TV"), but it can also be a system which embraces a very wide geographical area (as for example that in South Carolina, which connects about 60 school districts – approx. 200 classrooms – with a central station). The U.S.A. has been the pioneer country in the use of CCTV for teaching purposes. A report published in 1963 (Campion & Kelly, 1963) describes a survey carried out in the previous year which showed that about 500 CCTV installations were then in use for teaching and that 300, 000 pupils got some part of their teaching through CCTV. For U.S.A., these figures are not particularly high, but the rapid growth since 1958 was most striking; a rapid increase was also expected. Its use has spread to many other countries, among them England, Germany, France, the U.S.S.R., and Japan.

A minimum installation for transmission from one room to another has these characteristics: For picture transmission there is a TV camera in the sending area which is connected to a TV receiver in the viewing area and for sound transmission a microphone and loudspeaker respectively.

There is, however, comparatively little use for such a simple system in teacher training. Instead, one usually considers a larger installation of the general type outlined in Fig. 1. (It should be emphasised that the figure gives only a general sketch and not a complete technical diagram.) In the sending area (S) – usually the classroom – there are two or three cameras, of which at least one can be worked by remote control, both optically and for direction, and a number of microphones, one of them perhaps a neck microphone for the teacher. Picture and sound impulses go first into the control room (C), where they can be both

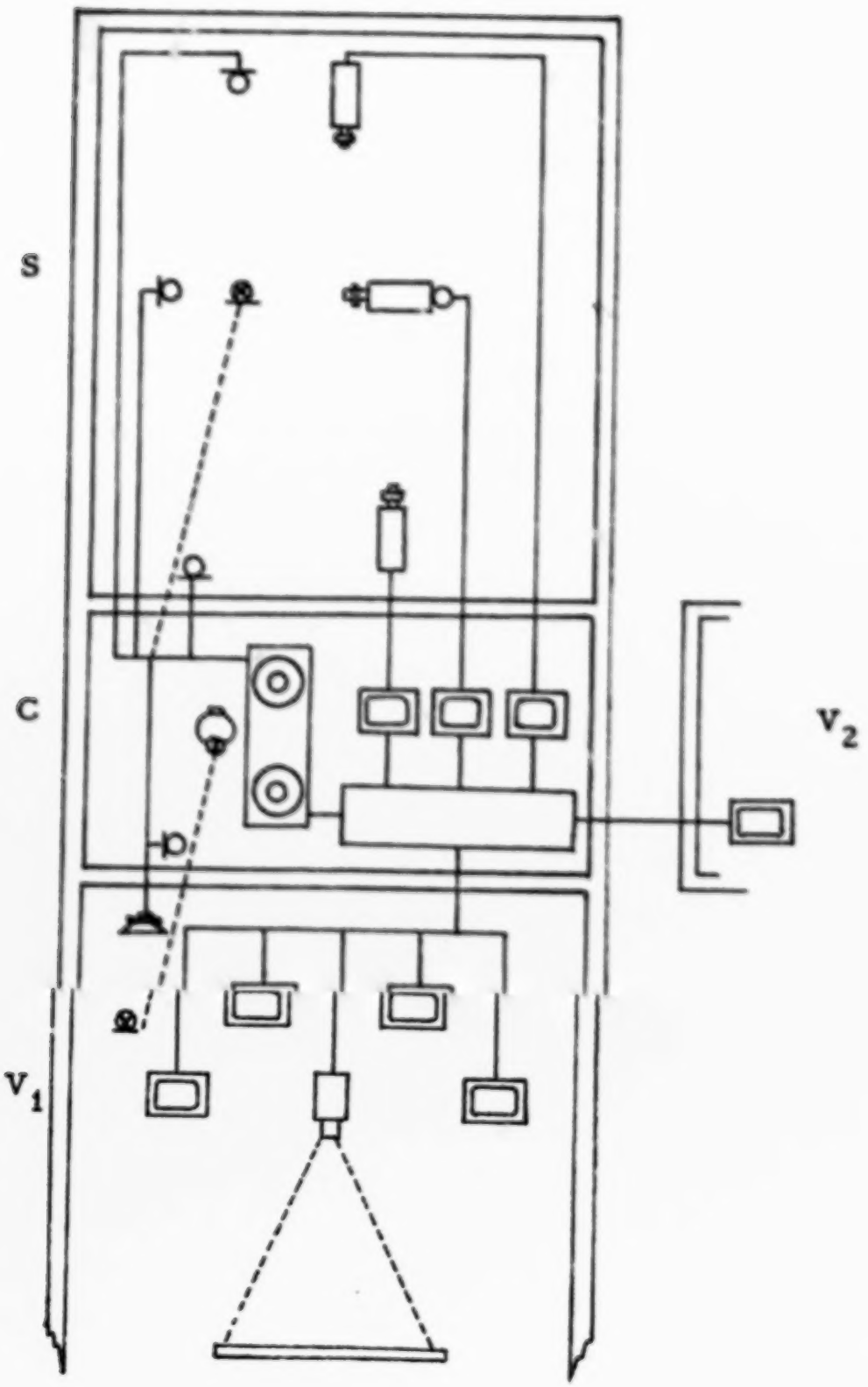


Figure 1. Typical installation

In the sending area (S) there are three TV cameras, one of which can be directed by remote control, three fixed microphones and one portable teacher's microphone.

In the control room (C) there are monitors, picture selectors and a video-tape recorder etc. In a large viewing area (V_1) there are, in addition to loudspeakers, either a number of TV receivers (four in the picture) or an enlarging projector. Viewing can take place simultaneously in separate rooms (e.g. V_2). A tutor/supervisor in the viewing room can communicate with the control room via a portable microphone.

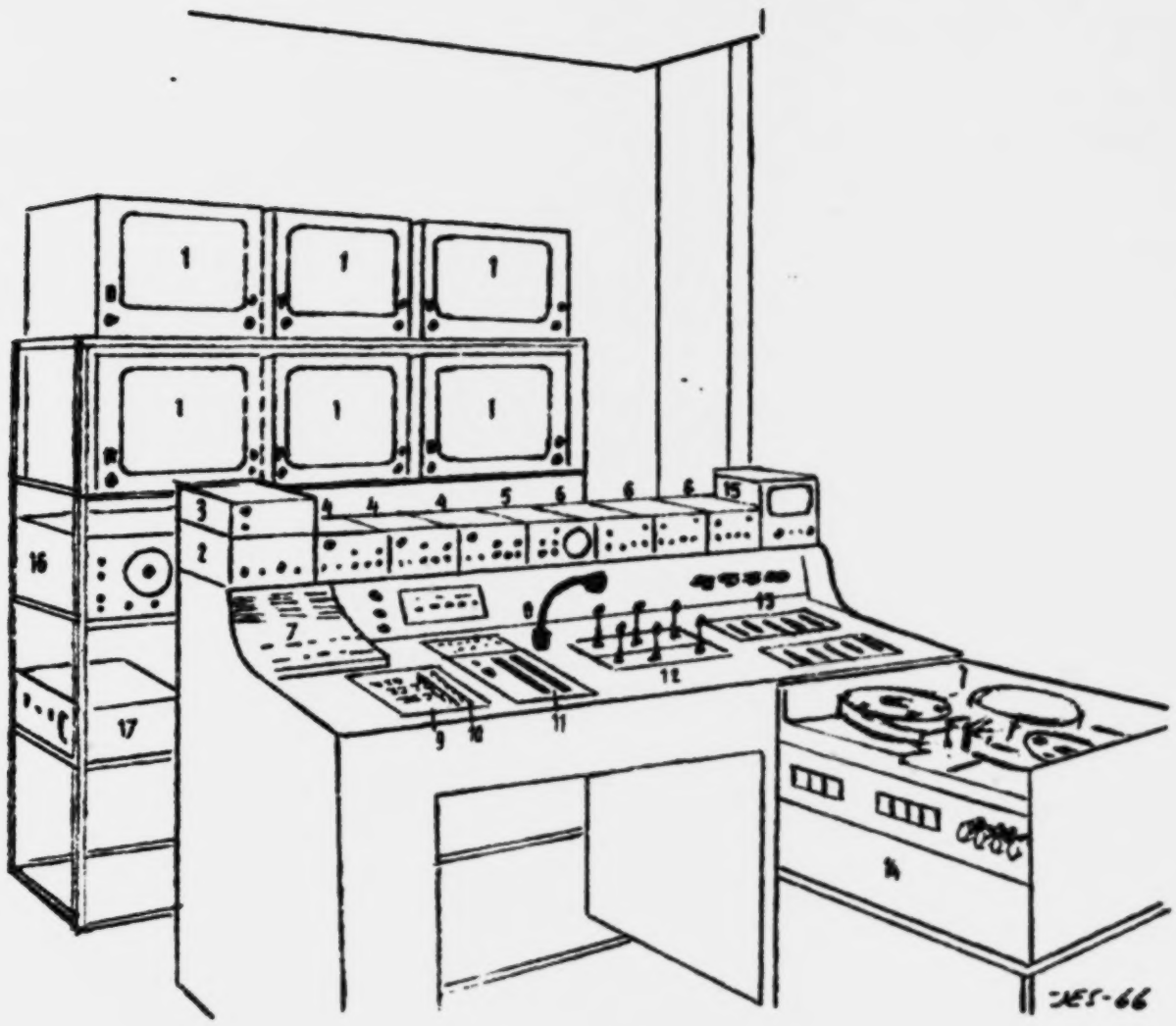


Figure 2. Sketch from the CCTV control room at the School of Education in Malmö.

1. Control monitors
   for 5 cameras + outgoing picture

   Control Board
2. sync generator
3. distribution amplifier
4. camera control
5. wave-form monitor
6. remote control units
7. intercom
8. studio communication unit
9. switch unit for videosignal out
10. camera selector for mixer
11. video mixer
12. joysticks for cameras
13. sound control
14. Video-tape recorder
15. Control monitor for video-tape recorder
16. Test pattern generator and receiver for wire-less microphone
17. RF generator

recorded by means of the video-tape recorder and also transmitted further either completely or partly to one or more viewing areas (V_1, V_2 etc.)

In the control room there is a picture receiver for each camera (monitor). In certain cases pictures from each camera are transmitted, so that there is one receiver for each picture in the viewing room. In other cases, the pictures are selected in the control room, and only one picture is transmitted to the viewers, i.e. the one which seems most valuable at a given moment. (A sketch of the of the CCTV control room at the School of Education in Malmö is given in Fig. 2.) If the viewing space is large, it can be equipped with a large number of receivers so that the viewers can form small groups for unhindered observation. But there is also the alternative possibility of using a special projector which shows an enlarged picture.

Within the framework of a system of this kind there are many possibilities for variation. The cameras can be fixed without operators, operated manually within the sending area, or manipulated by remote control. The microphones can be fixed, worked by remote control, or portable. The portable ones can be wired to the control room or of the wire-less type etc.

The video-tape recorder included in Fig. 1 is not, of course, a necessary ingredient. In fact, it is only in recent years that tape recorders of this type have been produced at a price which makes it possible for them to be bought in any numbers. The first generation of low-priced tape recorders have furthermore a number of significant limitations. However, as we shall see, video-tape recorders are a valuable addition to the arsenal of aids whose further development should be followed with great interest by those engaged in teacher training as well as by other teachers.

CCTV and video-tape recording as "observation amplifiers"

Numerous advances in science, education and production are the result of man's success in constructing new aids which have increased his capacity to receive information or process it, or both. The microscope is an example of an aid which has increased man's capacity to collect information, while a computer is a machine which has increased his ability to process it. Without making general comparisons, it would be useful to regard CCTV and video-tape recording as "observation amplifying" aids of potential value for education in general. Which types of observation amplifying arrangements of these aids is it most possible to use in teacher training? Figure 3 gives some main examples, which I will here

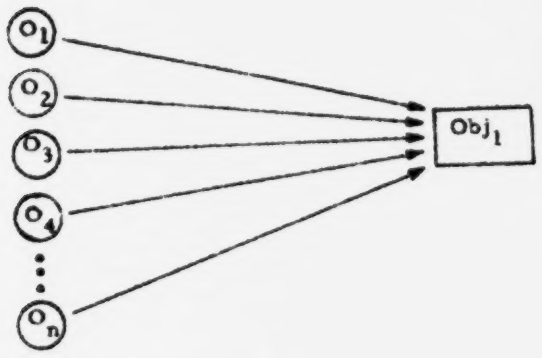
briefly explain and comment on.

By way of introduction, it would perhaps be of interest to remind ourselves that television is already widely used in other fields and that many of these uses are markedly of an "observation amplifying" character. The TV camera helps us, for example, to see very small things as well as very large things and also what it is difficult for us to get a closeup view of. Several of these uses should be applicable in a corresponding way in teacher training. When we look back at the difficulties we have already enumerated, we find several instances of limitations in the observer's capacity to observe.

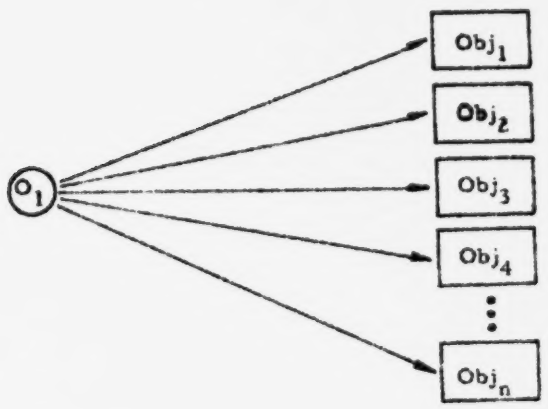
By "micro-showing" (Fig. 3a) we mean here the possibility of demonstrating small objects and events to a large group of simultaneous observers. This is perhaps one of the most frequent uses of television in other fields of education, e.g. in medicine. A dental or heart operation can be followed in detail by a large group of dental or medical students via the TV screen. A demonstration which would otherwise be limited to a very small group of direct observers can now be observed by an unlimitedly large group. This means that the events which the individual student would perhaps never have the opportunity of seeing because of their comparatively low frequency in the training or practice institution in question can be illustrated concretely in the course of teaching.

Several of the difficulties in teacher training referred to above could well be minimised if wider use were made of the micro-showing qualities of CCTV and video-tape recording. The possibility of giving a concrete demonstration of events within the framework of theory teaching is considerably increased, which should contribute to narrowing the gap between the worlds of theory and practice. Similarly the possibility of the student teacher's seeing and hearing details during the course of an observation lesson is also increased. The possibility of spreading information about infrequent phenomena to large groups is obvious. For this purpose we can use very simple arrangements of the "desk TV" type, by which a theory lecturer can demonstrate an individual pupil's work with self-instructional material or with a test (in this case the pupil is present in the lecture room). But it can also be demonstrations of test and study material from a studio or classroom (where, for example, a pupil and a tester or a pupil and a teacher can work undisturbed by the presence of an observation group) or the showing of a previously recorded demonstration. In this way the methods used in a laterality test, individual pronunciation training or in working with small groups can advantageously be demonstrated. Finally, it could be used for something more

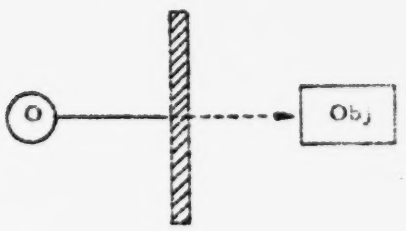
a) "Micro-showing"



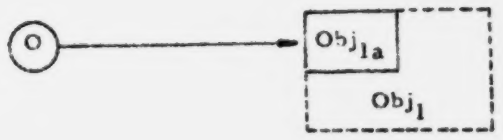
b) "Macro-showing"



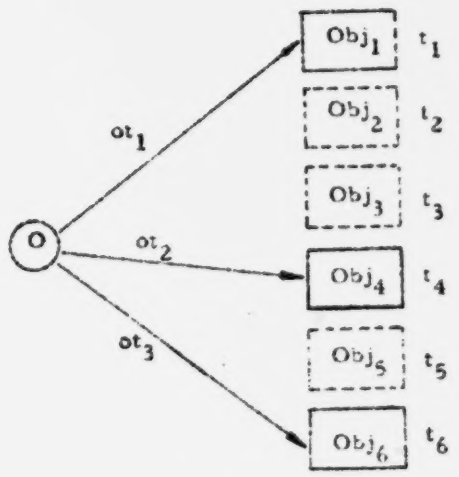
c) "Shielded showing"



d) "Focussed showing" (spatial selection)



e) "Concentrated showing" (time selection)



f) "Mirror showing"

Figure 3. Schematic examples of different types of "observation amplifying" arrangements possible with CCTV and video-tape recording.

Symbols: 0_1, 0_2, 0_3 etc. = observers

Obj_1, Obj_2 etc = objects for observation

t_1, t_2 etc. = time 1, 2 etc. in a sequence of events

ot_1, ot_2 etc. = time 1, 2 etc. in a sequence of observations

like the normal observation lesson, where the student teachers can follow a whole class at work, while a manually or remote control operated camera can take close-ups of interesting details in the course of the teaching.

"Macro-showing" (Fig. 3b) means that an observer can watch several separate observation areas. Signals from different sending areas are led into a common viewing area (with several TV receivers). We find this method used in supervision of traffic areas, prisons and factories; a single supervisor can by this means keep his eye on a large area without leaving his post. A comparable method can be used in teacher training for simultaneous or almost simultaneous observation of several different classes in which, for example, the same step in a given subject is being handled in different ways. Here it is not usually the case that one observer sees many observation objects, but instead that a group of observers, gathered in one place for tutorial discussion before and after the observation, can see picture material from two or more classrooms at the same time. Sound signals from the different classrooms can be switched on alternately to avoid disturbing the observer too much (alternating rather than completely simultaneous observation). Such observations should in many cases give a good background for evaluative and comparative discussion.

"Shielded showing" (Fig. 3c) means that the viewer and the object are shielded from each other. One of the most obvious examples of this type of use is in atomic laboratories. Processes which would be highly dangerous for an observer to study in situ because of radioactive radiation can be studied at a suitable distance or behind protective lead walls. Only the TV camera is in the actual location. In teacher training it is not of course necessary to protect the observer from the observed object. On the other hand, there is an obvious need to protect those observed (school pupils and their teacher) from disturbance by the observing group. Classes under observation do become relatively easily accustomed by experience to having a small group of observers in a corner of the classroom. (However, cf. figures in Table 1 above.) But – and this is a particularly important reservation – oral commentaries (by e.g. a teacher of method or education) during the course of the observation are out of the question. Furthermore, an observation group inside a classroom must always be small, whereas a group of observers can be of almost any size if shielded viewing is used. These two factors combined (the possibility of simultaneous commentary and of increasing the size of the group of observers) obviously

mean a considerable improvement in the observation situation and can theoretically help to avoid several of the difficulties in observing lessons already mentioned. It will be possible to make the observation more meaningful by carefully directing the observers' attention during the observation. All will obtain the same background of experience, which will also make it possible for the teacher of theory to give more detailed and adequate comments afterwards. A large group of student teachers can more easily be given the opportunity of observing even the less frequent phenomena. Administrative and schedule-making difficulties are reduced and students waste less time in travelling.

Another method of facilitating observation by student teachers is to direct their attention by means of selection of pictures to what the lecturer in education or method considers most interesting at a particular moment ("focussed showing": Fig. 3d). Technically, this works mainly in two ways: a roving camera is directed at the desired point of interest at the given moment, or a choice can be made in the control room between several incoming pictures (which are continually being studied in the monitors) of what is most profitable to distribute to the viewing room. This procedure has the pedagogic and psychological advantage that the confusing mass of possibilities for observation are cut down, what is considered important is brought to the foreground, and the rest, which from the point of view of informational psychology can at that moment be considered as irrelevant "noise", is cut out. If the choice is made skilfully (and this naturally makes great demands on the person selecting the pictures), this kind of technical device might considerably increase the educational effect of the observation period.

With the aid of the video-tape recorder, this spatial selection can be supplemented by selection in time. "Concentrated showing" (Fig. 3e) means that the raw material is cut and only certain essential points are shown. There are plenty of examples of this type of "reduced" sending in the conventional TV programs on sports or parliamentary discussions. Every football kick and every word said by a member of parliament are certainly not pearls, and skilful selection saves a great deal of time while yet giving sufficient information. The same thing can be done with classroom observation material. Student teachers sometimes experience an observation period as somewhat unproductive "sitting-in" partly because, as we have already pointed out, they are unaccustomed to observation and it is not possible to direct their attention, but partly also because a certain amount of what happens is naturally comparatively

uninteresting, at least as far as the specific point being studied is concerned. The conjuring trick we were seeking as a solution to this problem can be performed by the video-tape recorder. Technically this can be arranged either by making a partial recording or by making a selection later (e.g. by partial copying from another tape). The latter method allows a better planned selection to be made; the former, on the other hand, saves time and tape. What we get is a rationalised demonstration situation in which, in addition, we are not bound by time and space. To take one of many examples, there is nothing to prevent our using the material for evening refresher courses for teachers.

Once the observation material has been recorded on video-tape, there is moreover scarcely any limit to what can be done by editing. It would often be an advantage to produce a demonstration tape in which short illustrations of procedures are shown for comparative analysis (different ways of beginning a lesson, different ways of handling a breach of discipline, different ways of concretising abstract conceptions etc. etc.). Such "contrast-illustrating demonstration tapes" should obviously provide excellent starting points for tutorial discussion on many topics. By inserting a preparatory and/or subsequent commentary by the lecturer in method or education, the illustration tape can be built up into independent teaching material which can also be used by a less experienced group leader ("commentary-interfoliated demonstration tape"). An even more important possibility is perhaps that of inserting tasks for the observers. We have already described as seemingly wishful thinking the possibility of holding up a lesson in midaction to make it possible for the student teachers to consider and make their own decisions about a teacher's possible behavior when faced with concrete classroom incidents and then see what the teacher actually did and what the results were. But video-tape recording makes it possible to conjure with time in this way. Such activation of the observer could have several good effects: it compels him to pay close attention, to think more deeply and to take a more personal attitude. It can also be arranged so that misunderstandings are immediately corrected. Such tasks could therefore help to make the observation more meaningful and lessen the gap between it and what the students would do themselves in practice. "Task-interfoliated demonstration tapes" will in this way be similar to self-instructional material and also to the "classroom simulators" which have sometimes been used (usually with the aid of filmed material; see e.g. Vlcek, 1966). They could be used not only for training in adequate decisions and teacher-behaviors, but also as a test of the student teacher's

repertoire of behavioral tendencies relevant to the classroom role. They could also perhaps pave the way for both better methods of selection and better aids to grading than those we now have.

Finally, "mirror-showing" (Fig. 3f) means that a person can study himself and his own behavior patterns by means of video-tape recording. This method has been used for example in athletics teaching, where high-jump or stroke techniques are studied by the athletes themselves afterwards. A similar technique can be used in teacher training; to observe one's own lessons would become, with the aid of the video-tape, not something supernatural, but a highly practical aid in our attempts to make the student teacher aware of his shortcomings and merits.

So far we have mainly considered different ways of using closed-circuit television and video-tape recording in order to make students' lesson observation and teaching practice more effective. Obviously the advantages of these two aids as "observation amplifiers" can also be used in other ways in teacher training. In a situation where there is a lack of teachers of educational theory, CCTV can thus be used for "multiple direct teaching" (lectures and demonstrations are simultaneously transmitted to several different lecture rooms, perhaps even from one School of Education to branches in other places). Lecturers in pedagogy and method who are going to give lectures, demonstrations etc. on public television can, with the aid of the video-tape recorder, give themselves teaching practice ("previous rehearsal with play-back"). The technique of judging lessons could well be practiced by means of group evaluation of recorded material followed by discussions. The reliability of teaching marks could also possibly be increased by using a technique whereby a number of independent assessors judge the same lesson (which should not be administratively impossible with the help of recorded material: "objectivised behavior assessment"). There is not room here to go more deeply into the advantages and disadvantages of these different possibilities. They should however be borne in mind for further research work.

Among the already mentioned difficulties in teacher training, we also indicated our lack of basic knowledge as far as teaching methods are concerned, and we also noted that these problems are connected with insufficient research and the previous difficulties in recording objectively actual events in the classroom. There is no doubt that here too CCTV and video-recording have opened up new possibilities (cf. e.g. Gran, Lindell & Svensson, 1964; Stukát & Engström, 1966) which should gradually contribute to more definite basic knowledge. The advantages of video-recording as a "data-storage research aid" should not be forgotten in this connection.

Different types of proximal- and tele-observations

The various potential advantages of CCTV and video-recording we have enumerated as providers of observation experiences should obviously not imply in the present situation a total abolition of the traditional study visit, which offers a number of special opportunities which these two aids cannot easily give. We should however think of supplementing the traditional observation lesson with other forms of observation and thereby successively diminish the number of study visits insofar as our research shows that it is possible and advisable. Preliminary investigations (see e.g. Rogers, 1964) seem to indicate that the total number of observation hours in teacher training can be quite considerably reduced without loss of effectivity if some of the observation periods are replaced by well-planned TV arrangements. What we need above all are continual trials and research, in which the advantages and disadvantages of the various types of observation in different circumstances are systematically mapped out. Thereby it is particularly important not to oversimplify the problems, as sometimes happens. We should not be led to believe that we have only to compare two components with each other (conventional observation as against TV observation). A series of distinctions must be made.

In what follows we shall be talking about "tele-observations" (TO) when we mean different types of attempts to provide observation experiences at a distance with the aid of CCTV and/or video-recording. By "simultaneous tele-observation" (SITO) we mean the student teachers' observation of a direct transmission by means of CCTV. By "recorded tele-observation" (RETO) we mean the student teachers' observation of previously recorded material. Both simultaneous and recorded tele-observations can be of several different types. The kind and degree of "editing" is important, for instance. Besides the continuous, unedited presentation of events in the classroom, we can imagine both sample editing (shortening of observation sequences by means of a previously determined time-table for the selection of observations) and content-directed editing (in which the choice is made in direct relation to what happens: what is deemed valuable is retained and emphasised and the rest is cut out). Content-directed editing can be carried out at the control desk (partial camera cover and change of picture during simultaneous transmission or partial recording for taped transmission). But it can also take place at the receiving end (immediately in CCTV or afterwards in video-recording). This rough division already gives us eight different sub-types of tele-observation. It is probable that each of these has its special advantages and disadvantages and it will be necessary for those

engaged in teacher training to decide which technique he will use for each individual purpose.

These different types of tele-observations should be compared both with the usual type of observation, which we have called "proximal observation" (PO), and the more special type which we could call "shielded proximal observation" (SPO). By the latter we mean e.g. observation via one-way screens in a special observation room, where the observers are not sitting in the classroom itself. (In parenthesis, I would point out that the abbreviations given here serve only as a means of presenting information easily in tabular form and for brief reference in the present paper. They are not intended to be "official": it is certainly unnecessary to increase the already rich flora of abbreviations.)

Evaluative comparison of different observation arrangements

In Table 2 are exemplified eleven different observation arrangements. From certain points of view, a number of these are so alike that one could work with fewer. But on the other hand, there are certainly other ways of grouping which can be significant in certain circumstances, so that we should instead compare a larger number of different arrangements with each other. In any case education lecturers have seriously to consider questions of this type: To what degree do different conceivable arrangements imply special advantages, and what problems can they involve? This is obviously not the place for a systematic attempt at detailed evaluation: this should be the task of continuous research; but I shall briefly indicate a number of preliminary points.

It should first be stressed that every comparative evaluation should be as comprehensive as possible, i.e. starting from several different evaluation criteria. Among such criteria are: (a) the cost of the arrangement, (b) the personnel it requires, (c) its educational information value, (d) its value as a theory-practice integrator. In addition, every main criterion must be broken down into a number of sub-criteria if a comprehensive judgment is to be made possible. It is important that the question of costs should be looked at in the light of the total situation. Against the increased cost in the TV situation of apparatus and technicians must be weighed different types of saving (e.g. reduced cost of simplified administration, reduction in travel costs and wasted time, reduction in fees to teachers giving observation lessons etc.)

One should also beware of raising secondary evaluation criteria to the status and value of primary ones. Among the primary criteria we can

Table 2. Different main types of proximal observation (PO) and tele-observation (TO)

Time and place restriction	Degree and type of editing			
	Continuous unedited presentation	Sample editing	Content directed editing: carried out at control desk	Content directed editing: carried out at receiving end
In classroom and simultaneous ("Proximal observation"; PO)	Conventional observation: student visits classroom			
Adjoining classroom and simultaneous ("Shielded proximal observation"; SPO)	Shielded proximal observation, conventional type: student follows lesson from adjoining obs ervation room	Sample edited SPO: student registers impressions of only parts of lesson, guided e.g. by a special sound signal system		
Simultaneous but with increased freedom of placing ("Simultaneous tele-observation"; SITO)	Continuous unedited and simultaneous TO (with fixed cameras covering whole class): Student follows lesson on TV receivers (cable transmission)	Sample-edited SITO: TV picture switched off according to special timetable; interval used for note-taking or commentary	Edited simultaneous TO (1): selection only transmitted (partial camera cover with roving camera or selective transmission of available pictures)	Edited simultaneous TO (2): selection only switched on and commented upon at receiving end
Unrestricted both in time and place ("Recorded tele-observation"; RETO)	Continuous unedited and recorded TO: student follows lesson on TV receiver (connected to video-tape recorder)	Sample-edited RETO: student sees a sample (previously selected part of lesson); partial recording or partial playback	Edited, recorded TO(1): content-directed partial recording	Edited, recorded TO(2): recording with content-directed post-editing

reasonably include educational effectivity as defined by the goals of teacher training. It is a question of imparting certain knowledge and certain behavioral propensities to the student teacher. On the other hand a criterion such as the degree of "realism" of the arrangement, which is often brought up in discussions, is clearly only secondary. The "realism" of the presentation is important insofar as it can be shown that a more realistic presentation is more pedagogically effective than a less realistic one, but this is far from self-evident in all cases. The realistic situation can, for example, have such a low degree of structuring that its information value per time unit is very small.

Where certain types of instruction are concerned – such as giving information to the student about different teaching methods or teaching him to make critical decisions about specific aspects of the teacher-pupil interaction – it would be reasonable to suppose that recorded tele-observation is more effective pedagogically than simultaneous tele-observation, just as both types of tele-observation are more effective than conventional proximal observation. The reasons for such a hypothesis should be apparent from our previous discussion. Further, certain empirical studies, while not dealing with exactly the same problems, point in the same direction (see e.g. Stoller, Lesser and Freedman, 1964); although it is, of course, difficult to generalize from comparatively specific research situations.

Regarding the question of the type and degree of editing, we have not much empirical information to rely on. Much depends on the special purpose of the observation and how skillfully the editing can be done. In any case, it is obvious that good editing can do much to raise the pedagogic information value of a series of observations. If we assume that we want a series of observations to transmit special information, we must always reckon with difficulties if we use continuous unedited transmission. This is partly because of "disturbance factors" (a multitude of non-focal stimuli in the complex classroom interaction distract the attention from stimuli which are focal from the learning aspect) and partly because of structural weaknesses and lack of emphasis in the focal stimuli themselves. The cutting out of disturbance factors and "technical emphasis" on the focal stimuli would be excellent aids in getting a "message" across. In other connections, however, the purpose of imparting information is of a different character. Our intention may perhaps be to form certain habits of observation or simply to inculcate certain attitudes. Then the demand for editing is quite different, and in some cases unedited transmission (or sample selection) is the most suitable procedure.

Shielded proximal observation has marked advantages for many purposes. It combines the experience of being near the pupils which we get in conventional observation (and the possibility of an unhindered view) with the advantage of permitting a non-disturbing simultaneous commentary by the teacher of theory. The most obvious disadvantage is the economic one. It would be unrealistic to assume that sufficient special rooms of this type will exist in the immediately foreseeable future.

Problems and future perspectives

In order to make use of the potential advantages and profit from the rationalisation which would result from adequate use of tele-observation in teacher training, both varied research work and comprehensive production activities are necessary. Moreover it is important that research should be so planned that the possibilities of closed-circuit television and video-recording be tried out as comprehensively as possible. The work should not be restricted to the limited aim of producing certain types of demonstration tapes. Finally, here are a few examples of the many questions which should be taken up for consideration and discussion:

a) What demands for technical equipment and technical personnel must be made for different types of arrangement?
b) In what respects is the technical equipment available today unsatisfactory, and what possibilities are there of arriving at a better solution? (Video-recording techniques and large-screen projection could, for example, be made cheaper and be improved in several respects.)
c) Are there economically attractive alternatives to CCTV and video-recording which can compete in pedagogic effectivity (e.g., how well do sound tape-recordings illustrated with slides function)?
d) To what extent can conventional observation be replaced by CCTV and video-recorded observation?
e) Is there any risk that tele-observation could adversely affect the planning of lessons in the observed classes (e.g. more "frontal" teaching than is desirable, so as to make it more adaptable to the camera), and how should this difficulty be dealt with?
f) What special advantages and disadvantages has recorded tele-observation for different teacher training purposes compared with simultaneous tele-observation?
g) How should "mirror-showing" be arranged so that it is pedagogically most rewarding (individual showing, collective showing with commentary, or individual showing with subsequent demonstrations of behavior variations)?

h) Can video-tape technique be used with advantage for role-playing assignments in teacher training, and if so, how should they be planned?

i) To what extent can picture editing techniques involve a difficulty in fulfilling the demand for objectivity, and how important is this demand for different training purposes?

j) To what extent can meaningful observer-activations be inserted in simultaneous and recorded tele-observation so as to counteract one-way communication in TV-observation? Is it possible to arrange simple and pedagogically effective feed-back systems when CCTV is used for "multiple direct teaching"?

k) What contribution can different types of tele-observation make towards the training of student teachers in observing pupils (to produce the maximum sensitivity and objectivity), and how should such tele-training best be planned?

l) Do video-taped behavior tests of the simulator type mean better possibilities for prognosis of suitability for teaching and/or for objective grading of trainees than the methods now in use? If so, how should such tests be designed?

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Department of
Educational and
Psychological Research
School of Education
Malmö, Sweden

Abstract card

Bjerstedt, Å. Tele-observation: Closed-circuit television and video-recording in teacher training. Didakometry (Malmö, Sweden: School of Education), No. 16, 1967.

What are some of the problems and shortcomings in the present teacher training situation? In what respects can closed-circuit television and video-recordings as "observations amplifiers" help to overcome these difficulties? What further research is necessary before full use can be made of these aids in teacher training? Some possible answers to these questions are outlined and discussed.

Indexed:
a. Teacher training
b. Closed-circuit television
c. Video-recording

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